

STRESS EVALUATION ON MECHANICAL CONSTRUCTION AND ITS ALLIED MANUFACTURING INDUSTRY EMPLOYEES AND ITS BASIC IMPACT ON PRODUCTIVITY: A CASE STUDY

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ABSTRACT

This paper deals with the study on stress level of employees working in mechanical, construction based manufacturing industry. As well-known mechanical, construction and its allied industries is few among the industries which has higher work pressure and lesser time for relaxation, also early few decades had witnessed an exponential revenue and workmanship increase in mechanical and construction industry. It is the need of the hour to analyze the mental health of the employees in manufacturing industry. This study is based on the questionnaire by International Stress Management Association (ISMA) UK, and the data's were analyzed and presented. This is to be considered as the preliminary study on a broader topic and this study shows that a vast amount of employees in this industry were under critical stress pressure, and a proper psychological counselling is needed. Also an effective human resource policy can also play an important role in getting these employees out of the current stress vulnerability which will directly influence the mechanical, construction and its allied manufacturing industry productivity.

KEYWORDS: *Stress Evaluation, Construction Industry, Material Manufacturing Industry, Construction Management, Human Resources & Employee Motivation*

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INTRODUCTION

The mechanical and construction industry is the key industry which largely influences the national economy and has direct impact on a country's GDP. Mechanical and construction projects are mostly labor and employee-based with hard bound equipments and tools, as labor costs comprise 30 to 50 % of overall projects costs [1]. It was also proved that higher stress level leads to cardio vascular disease [2-4]. A study on manufacturing employees proved that the identified work characteristics, which were related to exhaustion, may represent underlying risk and protective factors [5]. A numerous labor productivity research studies have been undertaken, but only a limited studies were made on this industry employees and were addressed the productivity issue in developing countries. A lot of studies were based on the productivity issues of construction industry based on fixed factors [6-9] and these studies do not deals with the personal space of either employees or labors. A few studies were made on the effect of overtime work for employees/labors on the productivity [10-14]. Also the influences of personal characteristics of individuals and its direct influence on productivity was also studied [15]. It was evident that the job dissatisfaction in the construction industry vastly affects the industries productivity and also cause an

fall in profit margin [16]. Varied motivational methods were also proposed and studied to increase the productivity and profit of the construction industry [17-20]. A study on 62 automotive industries reveals that flexible production plants with team-based work systems, “high-commitment” HR practices (such as contingent compensation and extensive training), and low inventory and repair buffers consistently outperformed mass production plants. Variables capturing two-way and three-way interactions among the bundles of practices are even better predictors of performance, supporting the integration hypothesis [21]. All the studies which were made mostly do not deal with the individuals personal stress level and hence it is important that to study on their stress level. This study is a case study made on the employees and their stress level and initial observations were present. This result will help in identifying the problems of employees in mechanical and construction industry and their relative stress level.

STUDY METHODOLOGY

A total of 18 medium and large scale industries were taken into this survey. The employees from technical division (Execution and management) and marketing divisions were asked to answer the questionnaire. The questionnaire was taken from International Stress Management Association UK. A total of 653 employees were surveyed from these industries and was consolidated. The questionnaire consists of 25 questions were in the employees were asked a binary answer (Yes or No). The evaluation was based on their answers were yes carries 1 point and No carries 0 points. The stress level was ascertained and categorized as per ISMA classification, were Stress level-1 is the level were the total score is less than or equal to 4, and in this study is considered as Minimumstress (Safe). Stress level-2 is the second stage were the points lies between 5-13, and as per ISMA those who lies in this limit are more likely to experience stress related ill health either mental, physical or both. They would benefit from stressmanagement / counseling or advice to help in the identified areas. Stress level-3 is the final and advanced stage which starts from 14 points and above and those who lies in this level are the most prone to stress showing a great many traits or characteristics that are creating un-healthy behaviors. This means that they are also more likely to experience stress and stress-related illness e.g. diabetes, irritable bowel, migraine, back and neck pain, high blood pressure, heart disease/strokes, mental ill health (depression, anxiety & stress). It is important to seek professional help or stress management counseling.

Questionnaire Details

The following questionnaire was taken from ISMA UK a professional body in stress management which was distributed during National Stress Awareness Day (NSAD), and minor changes was made to suit the culture of the survey region.

- I frequently bring work home at night
- Not enough hours in the day to do all the things that I must do
- I deny or ignore problems in the hope that they will go away
- I do the jobs myself to ensure they are done properly
- I underestimate how long it takes to do things
- I feel that there are too many deadlines in my work / life that are difficult to meet
- My self confidence / self esteem is lower than I would like it to be

- I frequently have guilty feelings if I relax and do nothing
- I find myself thinking about problems even when I am supposed to be relaxing
- I feel fatigued or tired even when I wake after an adequate sleep
- I often nod or finish other peoples sentences for them when they speak slowly
- I have a tendency to eat, talk, walk and drive quickly
- My appetite has changed, have either a desire to binge or have a loss of appetite / may skip meals
- I feel irritated or angry if the car or traffic in front seems to be going too slowly/ I become very frustrated at having to wait in a queue
- If something or someone really annoys me I will bottle up my feelings
- When I play sport or games, I really try to win whoever I play
- I experience mood swings, difficulty making decisions, concentration and memory is impaired
- I find fault and criticize others rather than praising, even if it is deserved
- I seem to be listening even though I am preoccupied with my own thoughts
- My family life and concentration on it is lower
- I find myself grinding my teeth
- Increase in muscular aches and pains especially in the neck, head, lower back, shoulders
- I am unable to perform tasks as well as I used to, my judgment is clouded or not as good as it was
- I find I have a greater dependency on alcohol, caffeine, nicotine or drugs
- I find that I don't have time for many interests / hobbies outside of work

Analysis on Response to the Questionnaire

With the collected response to the questionnaires the data's were analyzed and presented. The Figure 1 shows the response for each questions with the binary answers and it is observed that most of the answers has higher percentage of 'yes'. Most questions bears more than 50 % answers as 'yes'. There by increasing the individual points which leads to higher stress level in the current scale. It can be well observed and discussed through Figure 2 which shows the percentage of 'Yes'. When the response was studied no questions bear less than 10% and 11% to 20% 'yes' response. Two questions has response percentage between 21% to 30%, Four questions has the response of 'yes' between 31% to 40%. The following limits of 'yes' response 51% to 60%, 61% to 70% and 71% to 80%has been carried by 5 questions to each limit. Four questions has the 'yes' response limit between 81% to 90%.

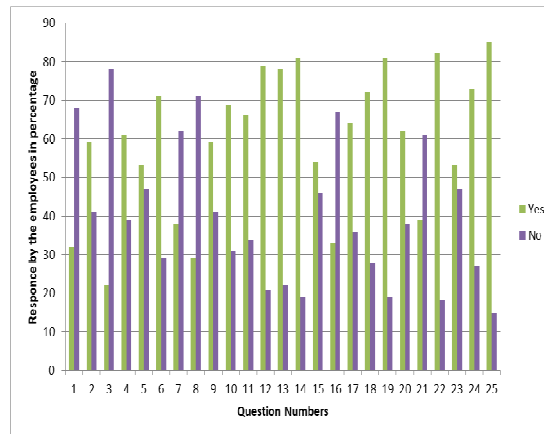


Figure 1: Percentage of 'Yes' And 'No' For Each Questions in Questionnaire

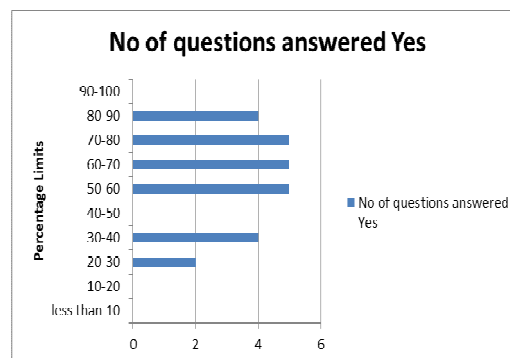


Figure 2: Percentage Limits With the 'Yes' For the Questionnaire (25 Questions)

The final analysis on stress level was analyzed in terms of percentage using the complete response to the questionnaire. Almost 48% of employees were in the Stress-3 level which is the advanced stage and needs counselling. The Stress-2 stage was occupied by 35% of employees and Stress-1 stage was occupied by 17% employees. Through this study it is evident that near about half the employees in mechanical and construction based manufacturing industries were under severe stress and this may be due to the fact that recent stress in industry and the recession existing in this area. Almost 83% of the employees are either in advanced stage of stress or starting stage which might influence the development of industry and in their personal terms. Only 17% of employees are in the safer limit which is there by a dangerous phenomenon observed through this study. This high stress occupation rate may affect the personal and professional effectiveness of the individual and also the improvement of the respective industry. Hence a the industry should have a HR policy on their side in supporting the employees and also regular counselling sessions should be arranged to keep this number under control and to stop stress relevant break down personally and officially.

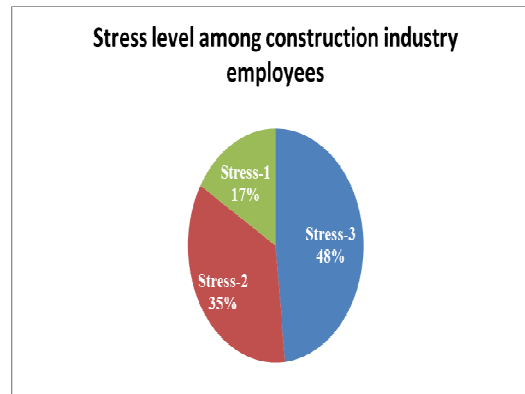


Figure 3: Chart for Stress Level of the Total Employees

CONCLUSIONS

The following conclusions were enumerated from the study made among the employees of mechanical, construction and allied manufacturing industry. The stress levels among employees were high and 48% of employees poses advanced stress stages. The response to questionnaire proves that most of the questions bears a 'yes' response. Almost 19 questions has more than 50% of 'yes' response which shows the reality of stress concentration in the industry. Only 6 of the questions has 'No' response higher than the 'yes' response. The stress concentration of the employees is identified as very high and there is a risk of many employees falling from stress-2 level to stress-3 level shortly which might further increase the employees in higher stress concentration. The study also shows that this high stress is due to the poor human resource policies followed by the mechanical, construction and its allied industries. Also the need for addressing the employees stress level is evident through this study and by doing so a development in working environment can be catered. The stress level will also has active influence on the productivity of both individual and the industry. Hence through this study it's been proposed to have a strong human resource policy and active program to refresh the employees and to get them out of current stress level is important. The results and conclusions made were through basic analysis on data's'. A in-depth psycho-cultural analysis and its relevance to the productivity and managerial decisions has to be interpreted and studied.

REFERENCES

1. Guhathakurta, S.; and Yates, J. 1993. *International labour productivity*. *Cost Engineering Journal*, Vol.35, (pp.15-25).
2. Appels A, Mulder P, 1988, *Excess fatigue as a precursor of myocardialinfarction*. *Eur Heart J* Vol. 9, (pp.758–764)
3. Appels A , 1999, *Inflammation and the mental state before an acute coronary event*. *Ann Med* Vol. 31 [Suppl1], (PP.41–44)
4. Cole SR, Kawachi I, Sesso HD, Paffenbarger RS, Lee IM, 1999, *Sense of exhaustion and coronary heart disease among college alumni*. *Am J Cardiol*, Vol. 84, (PP. 1401–1405).
5. Pia Schnorpfeil Æ Alexander Noll Æ Petra Wirtz Renate Schulze Æ Ulrike Ehlert Æ Karl Frey Joachim E. Fischer, 2002, *Assessment of exhaustion and related risk factors in employees in the manufacturing industry – a cross-sectional study*, *Int Arch Occup Environ Health*, Vol.75, (PP.536-540).
6. M. Kaveri & G. Prabakaran, *Impact of Work Stress Factors on Employees Job Performance with Special Reference to Leather Goods Manufacturing Companies at Vellore District*, *International Journal of Human Resource Management and Research (IJHRMR)*, Volume 3, Issue 2, May - Jun 2013, pp. 121-132.

7. Lim, E. C.; Alum, J. 1995. *Construction productivity: issues encountered by contractors in Singapore*. *International Journal of Project Management*, Vol.13, (pp.51-58).
8. Rojas, M. E.; Aramvareekul, P. 2003. *Labour productivity drivers and opportunities in the construction industry*. *Journal of Management in Engineering*, Vol.19, (pp.78-82).
9. Thomas, H. R.; 1999. *Construction baseline productivity: theory and practice*. *Journal of Construction Management and Engineering*, Vol. 125, (pp. 295–303).
10. Thomas, H. R.; Sanders, S. R. 1991. *Factors affecting masonry productivity*. *Journal of Construction Engineering and Management*, Vol. 117, (pp. 626–644).
11. Thomas, H.R.; 1992. *Effects of Schedule Overtime on Labor Productivity*, *Journal of Construction Engineering and Management*, Vol.118, (pp. 60-76).
12. Hanna, A.S.; Chang, C.K.; Sullivan, K.T. and Lackney, J.A.: 2008. *Impact of Shift Work on Labor Productivity for Labor Intensive Contractor*, *Journal of Construction Engineering and Management*, Vol.134, (pp. 197-204).
13. Hanna, A.S.; Taylor, C.S. and Sullivan, K.T.: 2005. *Impact of Extended Overtime on Construction Labor Productivity*, *Journal of Construction Engineering and Management*, Vol.131, (pp. 734-739).
14. P. V. Varaprabhakkar & T. Venkata Ramana, *Impact of Work Stress on Employee Satisfaction of Confectionery Industry in Andhra Pradesh*, *International Journal of Human Resource Management and Research (IJHRMR)*, Volume 4, Issue 6, November - December 2014, pp. 69-76
15. Nepal, M.P.; Park, M. and Son, B.: 2006. *Effects of Schedule Pressure on Construction Performance*, *Journal of Construction Engineering and Management*, Vol.132, (pp.182-188).
16. Ibbs, W.: 2005. *Impact of Change's Timing on Labor Productivity*, *Journal of Construction Engineering and Management*, Vol.131, (pp.1219-1223).
17. Baba, K.: 1995. *Cultural Influences on Construction Management*, *Proceeding of the 1st International Conference on Construction Project Management*, (pp. 99-106).
18. Borcharding, J. D.; Oglesby, C. H. 1975. *Job dissatisfaction in construction work*, *Journal of Construction Division*, Vol.101, (pp. 415–434).
19. Khan, M. S. 1993. *Methods of motivating for increased productivity*, *Journal of Management in Engineering*, Vol.9, (pp.148–156).
20. Laufer, A.; Jenkins, G. D. 1982. *Motivating construction workers*, *Journal of Construction Division*, Vol.108, (pp.531–545).
21. Maloney, W. F. 1981. *Motivation in construction: a review*, *Journal of Construction Division*, Vol.107, (pp.641–647).
22. Maloney, W. F.; McFillen, J. M. 1986. *Motivational in unionized construction*, *Journal of Construction Engineering and Management*, Vol.112, (pp.122–135).
23. John Paul Macduffie, 1995, *Human Resource Bundles and Manufacturing Performance: Organizational Logic and Flexible Production Systems in the World Auto Industry*, *ILR Review*, Vol. 48, (PP. 197-221)